

A new observation of Ovummuridae, from the mid-Silurian (Wenlock) strata of Wenlock Edge, Shropshire, UK: A preliminary report

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ROGERS, S.L.¹, BLACKBURN, J.A.^{1,2} and PRICE, D.R.¹ (2017). A new observation of Ovummuridae, from the mid-Silurian (Wenlock) strata of Wenlock Edge, Shropshire, UK: A preliminary report. *Proceedings of the Shropshire Geological Society*, **18**, 74–79. Calcareous microfossils belonging to the family Ovummuridae Munnecke, Servais and Vachard, 2000, are described for the first time from the Silurian strata of Wenlock Edge, Shropshire, UK. This occurrence increases the known palaeogeographical range of the Ovummuridae from the Silurian. The presence of these calcareous microfossils highlights the exceptional level of fossil preservation within the Wenlock Edge Limestone Formation, and may provide insights into the diagenetic history of the formation.

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INTRODUCTION

The Ovummuridae Munnecke, Servais and Vachard, 2000, are a family of calcareous microfossils with an unknown biological affinity. Minoura and Chitoku (1979) provided the first description of the genus *Ovummurus* (including the type species *O. duoportius*) from the upper Pennsylvanian of eastern Kansas, USA. This was followed by reports of Munnecke & Samtleben (1996) and Munnecke (1997), and detailed taxonomic description (Munnecke *et al.*, 2000) of these calcareous microfossils. Munnecke *et al.* (2000) described not only the genus *Ovummurus* (the first description of the genus outside eastern Kansas), but also created the family Ovummuridae and erected three new genera (*Arouxina*, *Minourella* and *Samtlebenella*) based on samples from the Silurian of Gotland.

The Ovummuridae comprise several morphotypes of calcareous microfossils. The microorganisms are characterised by two or more chambers, an aperture at the apex of the chamber and a calcareous wall comprising small slab- or tablet-like crystals arranged in concentric layers (Munnecke *et al.*, 2000). The known stratigraphic distribution of the Ovummuridae spans from the Llandovery (mid-Silurian) to the Guadalupian (Upper Permian). The Ovummuridae have been observed from a

wide variety of palaeoenvironments and are thought to have had a planktonic mode of life (Munnecke *et al.*, 2001). These microfossils have only been reported from lithologies which display exceptional preservation, particularly in limestones with little evidence of diagenetic alteration, dolomitisation or neomorphism (Munnecke *et al.*, 1999).

This paper provides preliminary observations of the Ovummuridae from the Silurian of Wenlock Edge in Shropshire, UK (specifically the Much Wenlock Limestone Formation). The main objectives of this short correspondence are to firstly contribute to the growing reports of the stratigraphical distribution of the Ovummuridae, and secondly to highlight the excellent preservation potential for calcareous microfossils in the Silurian of Wenlock Edge, and possibly other outcrops of a similar age throughout the UK.

The Much Wenlock Limestone Formation (Homerian) outcrops extensively in Shropshire, forming the Wenlock Edge escarpment (Figure 1). The Much Wenlock Limestone Fm. of western England (Murchison, 1833) was deposited on the stable Midland Platform and extended westwards towards the subsiding Welsh Basin (Ratcliffe & Thomas, 1999; Ray *et al.*, 2010) (Figure 2). On the Midland Platform, shallow subtropical seas allowed carbonates to develop with a network of patch reefs forming above the storm wave base and within the

photic zone (Ratcliffe & Thomas, 1999). Further west, on the eastern margin of the Welsh Basin, the formation was deposited in a deeper environment below the storm wave base (Ratcliffe & Thomas, 1999).

Shergold and Bassett (1970) subdivided the Much Wenlock Limestone Fm. of Wenlock Edge into the reef tract and off-reef tract. The reef tract, running from Benthall Edge to

Easthope, is comprised of limestones with abundant patch reefs (Scoffin, 1971). These patch reefs are absent within the off-reef tract which extends from Easthope, westwards to the River Onny along Wenlock Edge (Shergold & Bassett, 1970). Other exposures of the formation further south and west in the Ludlow Anticline also lack reefs (Holland *et al.*, 1963).

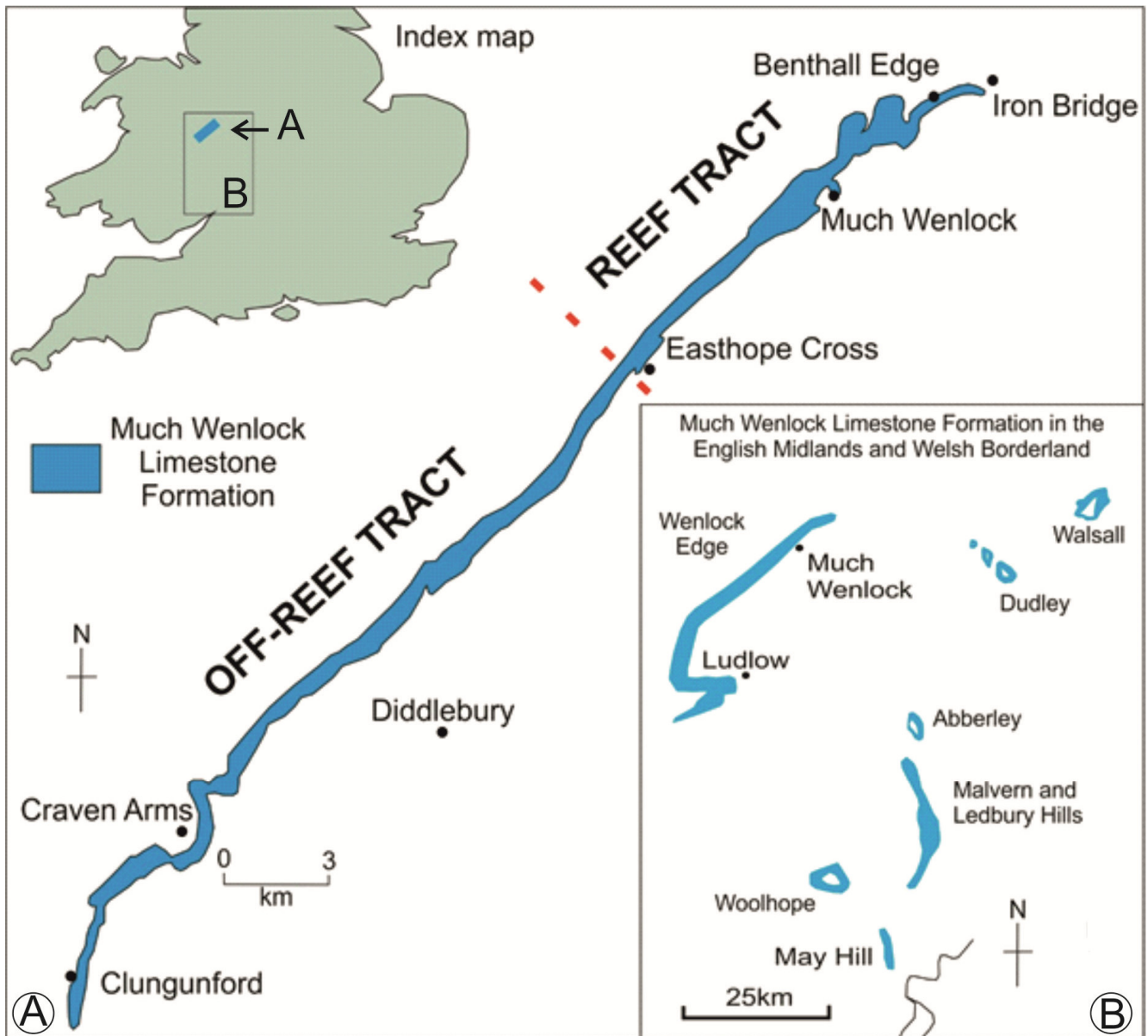


Figure 1. Location maps indicating the extent of Wenlock Edge in Shropshire (A) and the distribution of the Much Wenlock Limestone Formation in the English Midlands and Welsh Borderland (B). The positions of the areas shown in A and B, with respect to England and Wales, are highlighted in the embedded Index Map. After Blackburn (2016).

PRELIMINARY RESULTS

The majority of samples were collected from the off-reef tract of the Much Wenlock Limestone Fm.. In addition, three samples were obtained from Lea Quarry within the reef tract. Note that several of the exposures of Much Wenlock Limestone Fm. along Wenlock Edge are designated SSSIs (for geological and/or wildlife conservation). No hammering or collecting should be undertaken without prior permission from Natural England. The samples were prepared for thin sectioning, mounted at a thickness of 60µm. These are thicker than 'normal' (most thin sections are cut to 30µm thickness). These sections were then observed using a polarizing microscope before undergoing etching in a manner similar to that outlined by Munnecke & Servais (1996) for investigation with a Scanning Electron Microscope (SEM). A Hitachi Tabletop TM3000 at Keele University was used.

Ovummuridae have been observed in the majority of thin sections studied using this SEM investigation. The specimens observed so far belong to the species *Ovummurus duoportius* and, more commonly, *Minourella gotlandica*. They display the characteristic ellipsoidal test, two chambers and a wall consisting of calcite tablets (Figure 3). Specimens often exhibit a quartz overgrowth and are commonly observed to enclose quartz clasts. Both features are highlighted by MacNeil & Jones (2006). *M. gotlandica* found within the Wenlock Edge

samples have been smaller than those reported from elsewhere, measuring no greater than 130µm in height and 60µm in width. Specimens have also been found in lower numbers than in other occurrences. For example, MacNeil & Jones (2006) report one thin section containing ~1200 specimens.

IMPLICATIONS AND FUTURE WORK

The occurrence of Ovummuridae in Shropshire increases the known palaeogeographical range for the family. Perhaps more importantly, this occurrence highlights the exceptional preservation potential for calcareous microfossils within the Much Wenlock Limestone Fm.. With further investigation (and anticipated observation of additional specimens) the taxonomy of the Ovummuridae reported here can be constrained and the significance of the population better understood. The study of calcareous microfossils from the Much Wenlock Limestone Fm. of Shropshire may also reveal valuable information about the diagenetic history of the formation and the role that aggrading neomorphism may have had on the deposits observed today. Indeed, Munnecke *et al.* (2001) state that Ovummuridae are "...only preserved in Konservat-Lagerstätten without late diagenetic overprint." Other carbonate formations/lithologies in Shropshire may also be worth investigating using etched samples and SEM analysis.



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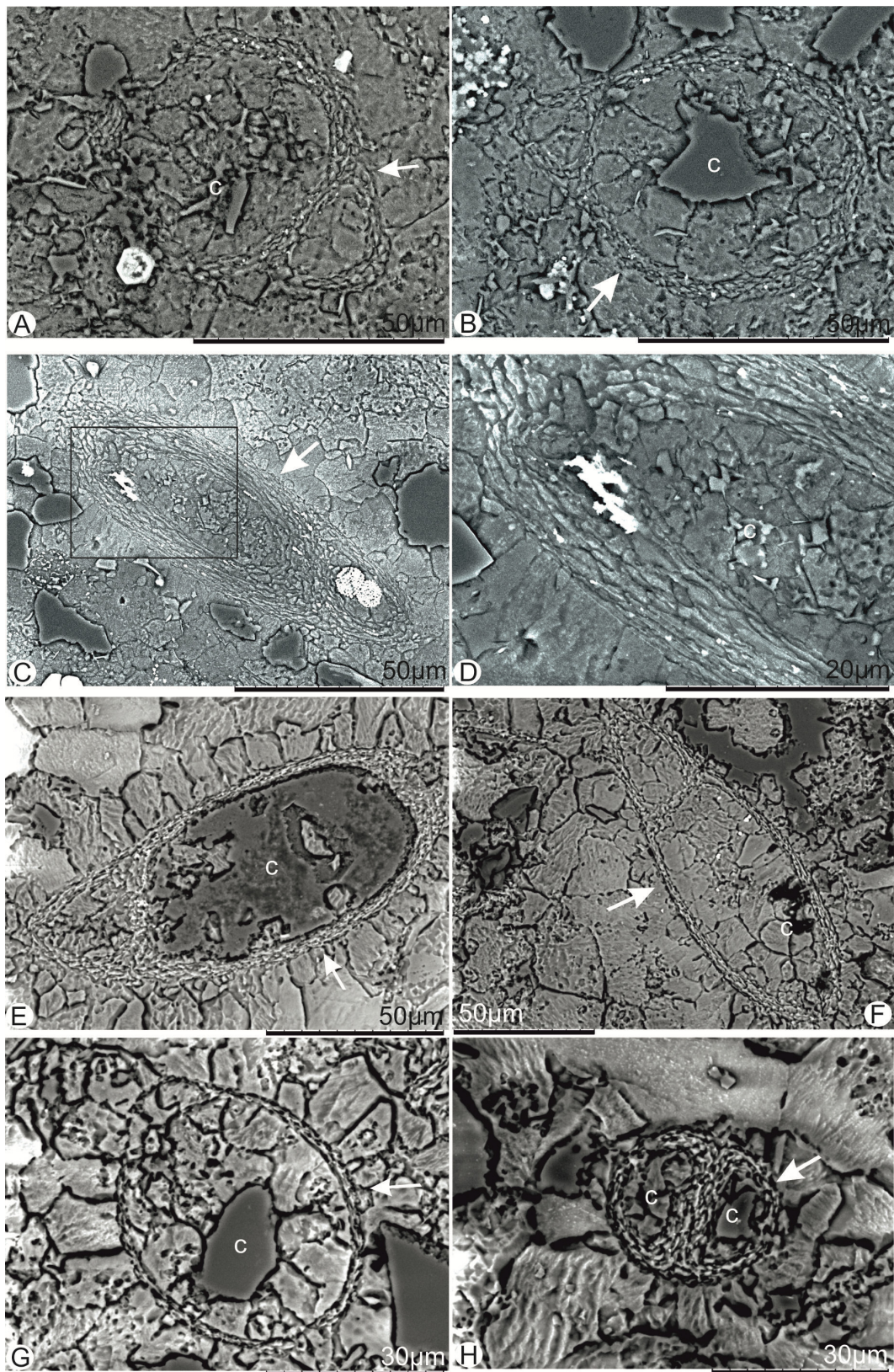


Figure 3. Specimens of Ovummuridae observed from the Much Wenlock Limestone Formation of Shropshire. All of the specimens shown here belong to the species *Minourella gotlandica* except for photomicrograph H, which shows an *Ovummurus duoportius*. A, B, C, E, F and G show whole specimens (arrows) of *M. gotlandica*, exhibiting two characteristic chambers, one much larger than the other. C, E and F are sections cut at 90° to those shown in A, B and G. D is a zoomed-in image of the area highlighted in C. Here the tablet-like nature of the calcite walls can be observed. H, shows the typically near symmetrical chambers of *O. duoportius*. Note that the specimen is much smaller than the others exhibited here. Clasts of siliciclastic material can be observed in these specimens (highlighted by the letter 'c' in all but image C).

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